

# EMISSION CONTROL, ABATEMENT TECHNOLOGIES AND REMEDATION - POSTERS

## CATALYTIC DESTRUCTION OF PCDDs/DFs BY THE SCR UNITS

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### Introduction

In Korea, one of the hottest issues of recent environmental problems is dioxins (polychlorinated dibenzo-p-dioxins) including furans (polychlorinated dibenzofurans). Especially MSWI (Municipal Solid Waste Incinerator) has been noticed as the principal source of dioxins among many dioxin sources. So, the Korean government has reinforced the Dioxin emission standard value as 0.1 ng-TEQ/Nm<sup>3</sup> in the flue gas of the MSWI.

At present, more than 10 MSWIs have been operated since 1986 and also the government and commercial companies have plans to construct more incinerators to increase the portion of waste incineration up to 20% till next year. Because it is still particularly important method to reduce the waste volume and produce energy as usual. Therefore, to satisfy the dioxin emission level as 0.1 ng-TEQ/Nm<sup>3</sup> in the flue gas, many sophisticated flue gas cleaning equipments have been installed. In this study, we have shown the effect of temperature for the dioxin removal efficiency in the flue gas on the commercial SCR unit (Table 1).

Table 1. The specification of MSWI

	<i>Specification</i>	<i>Remarks</i>
<i>Incinerator Type</i>	STOKER	ROLLER GRATE
<i>Capacity(Tons/Day)</i>	600	300 x 2
<i>Air Pollution Control Facility</i>	EP(Electrostatic Precipitator) WS(Wet Scrubber) SCR(Selective Catalytic Reduction)	Dust Removal SOx Removal Dioxin and NOx Removal
<i>Incineration Material</i>	Municipal Solid Waste	
<i>Dioxin</i>	0.1 ng-TEQ/Nm <sup>3</sup>	12% O <sub>2</sub> base

### Materials and Methods

Flue gas samples were collected by the isokinetic sampling method, the isokinetic range was between 95 and 105%, and collected samples were extracted, purified, concentrated and finally analyzed according to JIS (Japanese Industrial Standard) method. In order to monitor the performance of the sampling, clean up and analysis method, <sup>37</sup>Cl or <sup>13</sup>C labeled compounds have been spiked to samples. Those are sampling standard (<sup>37</sup>Cl<sub>4</sub>-2,3,7,8-TCDD), clean up standard (15 kinds of <sup>13</sup>C<sub>12</sub> labeled 2,3,7,8-substituted dioxins and furans) and syringe standard (<sup>13</sup>C<sub>12</sub>-1,2,3,4-TCDD and <sup>13</sup>C<sub>12</sub>-1,2,3,7,8,9-HxCDD), respectively.

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## Results and Discussion

Figure 1 shows the concentration and removal efficiency of dioxins(PCDDs) and furans(PCDFs) before and after the commercial SCR process. After SCR process, the concentrations of PCDDs and PCDFs were reduced below about one-tenth compared with the original dioxin concentration. The dioxin removal efficiency was nearly independent of SCR operating temperature and also the removal patterns of the congener was nearly same both the 170 and 320°C.

The SCR process, which has been designed, constructed and operated by HHI, successfully removed the PCDDs and PCDFs contained in the flue gas of the waste incinerators. The concentration of dioxins including furans could be easily and reproducibly adapted to the government regulation, 0.1 ng-TEQ/Nm<sup>3</sup>. And the SCR process completely removes dioxins and furans to the H<sub>2</sub>O and CO<sub>2</sub>, so the SCR process is very clean process compared with BF(Bag Filter) process. Therefore, to regulate the dioxin level of the flue gas of the waste incinerators, the SCR process should be reasonable choice among many candidates for dioxin removal process. Finally, the removal efficiency of dioxin in the flue gas was nearly independent of SCR operating temperature both 170 and 320°C.

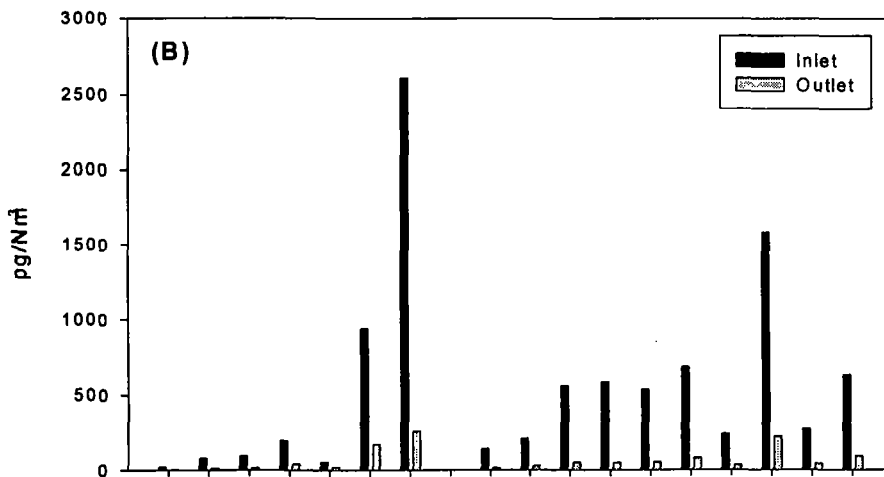
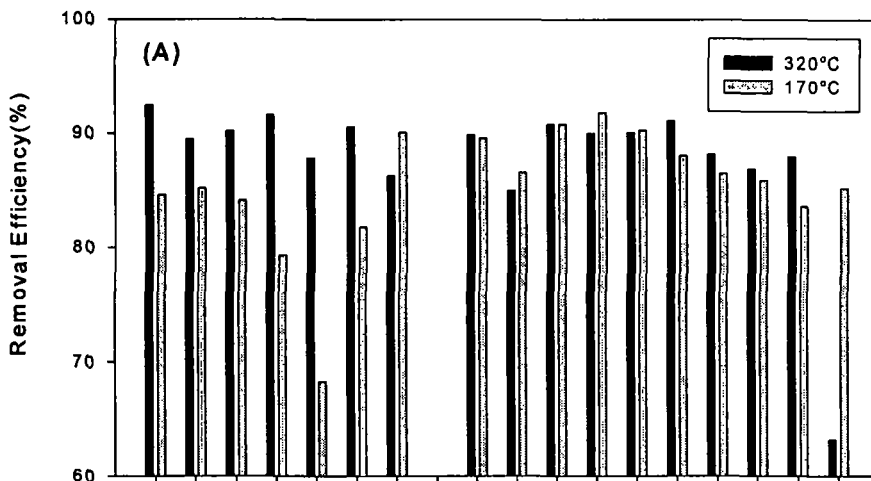
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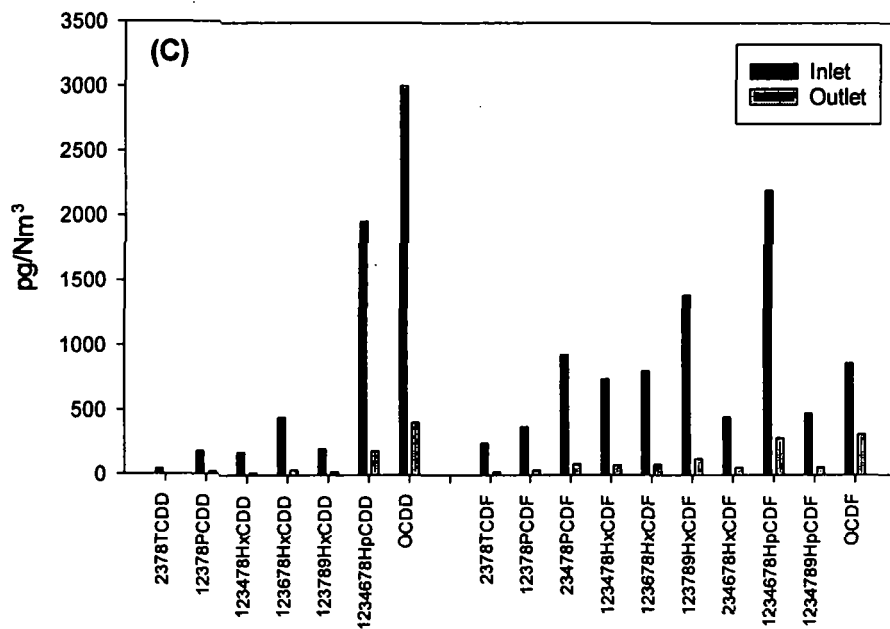


Figure 1. The dioxin concentration and removal efficiency at the different SCR operating temperature.

- (A) Dioxin removal efficiency
- (B) SCR temperature : 170°C
- (C) SCR temperature : 320°C

